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Imaging

CORONARY CT ANGIOGRAPHY USING ULTRA-LOW DOSE CONTRAST MEDIA: RADIATION DOSE AND IMAGE QUALITY

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Backgrounds: The radiation dose and the amount of contrast media are the limitation of coronary CT angiography (CTCA). Low dose protocol of contrast media using 80kV has not been elucidated.We compared the radiation dose and image quality of the ultra-low dose protocol using 80kV and standard protocol using 120kV in patients with low-weighed patient.s

Methods: One hundred eighty-one low-weight (<65kg and body mass index <26kg/m2) and low calcium (CAC<=200 and calcified plaque less than half size vessel diameter) patients were enrolled. Among them, 154 patients who showed valid peak time and attenuation by test injection randomly performed CTCA targeting 280 HU of attenuation using 80kV (n= 51), targeting 350 HU of attenuation using 80kV (n= 51) or targeting 350 HU using 120kV (n= 51) by 64-row MDCT with prospective gating. The amount of contrast media was decided by attenuation controlling system. Patients who had low left ventricular function (ejection fraction<50%), congenital heart disease, atrial fibrillation, stent, coronary artery bypass grafts were excluded. Intracoronary attenuation, the predicted amount of contrast media, CTDIvol, dose length product, effective dose, and image noise were measured. Five-point image quality (5-excellent and easily assessable, 1-unassessable) assessed by well-trained two independent cardiologists.

Results: All patients successfully underwent CTCA with prospective gating. Intracoronary attenuation of 80kV/280HU-CTCA, 80kV/350HU-CTCA and 120kV/350HU-CTCA were 278±24HU, 348±23HU and 358±33HU, respectively. Although image noise were higher 80kV-CTCA than 120kV-CTCA, there was no significant difference in image quality between 80kV/350HU-CTCA and 120kV/350HU-CTCA (4.7±0.7 vs. 4.6±0.6, p=0.390). There was also no significant difference in image quality between 80kV/280HU-CTCA and 80kV/350HU-CTCA (4.4±0.7 vs. 4.7±0.4, p=0.056). The amount of contrast media and effective dose was lower 80kV-CTCA than 120kV-CTCA. The lowest amount of contrast media per body weight was 0.08 ml/kgBW (5 ml).

Conclusions: 80kV-CTCA targeting 280HU may decrease the amount of contrast media and radiation dose keeping image quality.